DOCUMENT RESUME

ED 114 734 CG 010 194

AUTHOR	Guinn, Nancy; And Others
TITLE	Screening for Adaptability to Military Service. Final Report for Period July 1974-April 1975.
INSTITUTION	Air Force Human Resources Lab., Lackland AFB, Tex. Personnel Research Div.
REPORT NO	AFHRL-TR-75-30
PUB DATE	May 75
NOTE	32p.
EDRS PRICE	MF-$0.76 HC-$1.95 Plus Postage
DESCRIPTORS	*Adjustment (to Environment); Institutional Research; *Military Personnel; Military Service; *Personality Assessment; Personality Tests; *Personnel Selection; *Screening Tests
IDENTIFIERS	*History Opinion Inventory

ABSTRACT

A sample of 15,252 basic airmen were administered the History Opinion Inventory (HOI) during basic military training. This 100-item self-report inventory was designed to tap dimensions of school adjustment, family stability, social orientation, emotional stability, bodily complaints, motivations and expectations for achievement, and response toward authority. The service careers of the subjects were then monitored for two years in order to assess the ability of the HOI to predict the criterion of in/out service. An a priori adaptation index developed from HOI items correctly identified as high risk 23 percent of those subjects discharged from service during the two-year period, while incorrectly labeling as high risk only 6 percent of those subjects still in service after two years. The possibility of increasing the accuracy of prediction by utilizing biographic/demographic data is discussed along with the operational usefulness of ths History Opinion Inventory. (Author)

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AFHRL-TR-75-30

ED114734

AIR FORCE HUMAN RESOURCES LABORATORY

SCREENING FOR ADAPTABILITY TO MILITARY SERVICE

By

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May 1975
Final Report for Period July 1974 – April 1975

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This final report was submitted by Personnel Research Division, Air Force Human Resources Laboratory, Lackland Air Force Base, Texas 78236, under project 7719, with Hq Air Force Human Resources Laboratory (AFSC), Brooks Air Force Base, Texas 78235. Dr. Nancy Guinn, Demographic and Attitudinal Research Branch, was the task scientist.

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HAROLD E. FISCHER, Colonel, USAF
Commander

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER AFHRL-TR-75-30	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) SCREENING FOR ADAPTABILITY TO MILITARY SERVICE		5. TYPE OF REPORT & PERIOD COVERED Final July 1974 – April 1975
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Nancy Guinn Allan L. Johnson Jeffrey E. Kantor		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Personnel Research Division Air Force Human Resources Laboratory Lackland Air Force Base, Texas 78236		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62073F 77190241
11. CONTROLLING OFFICE NAME AND ADDRESS Hq, Air Force Human Resources Laboratory (AFSC) Brooks Air Force Base, Texas 78235		12. REPORT DATE May 1975
		13. NUMBER OF PAGES 32
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

adaptability
personality inventories
screening methodology
maladaptive accessions
high-risk personnel

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A sample of 15,252 basic airmen were administered the history opinion inventory (HOI) during basic military training. The service careers of these subjects were monitored for two years in order to assess the ability of the HOI to predict the criterion of in/out of service. An a priori adaptation index developed from HOI items correctly identified as high risk 23 percent of those subjects discharged from service during the two year period, while incorrectly labeling as high risk only 6 percent of those subjects still in service after two years. The possibility of increasing the accuracy of prediction by utilizing biographic/demographic data and the operational usefulness of the HOI are discussed.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

PREFACE

This research was conducted under Project 7719, Air Force Personnel System Development on Selection, Assignment, Evaluation, Quality Control, Retention, Promotion, and Utilization; Task 771902, Exploration of Methods for Increasing the Effectiveness of Personnel Programs.

Appreciation is expressed to Mr. Jim Friemann and A1C Vance Smith of the Computational Sciences Division, Air Force Human Resources Laboratory, for their professional and technical assistance in computer programming and accomplishment of desired analyses.

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SCREENING FOR ADAPTABILITY TO MILITARY SERVICE

I. INTRODUCTION

Identification of personnel who are most likely to succeed on the job is the primary goal of every selection and classification program. Hiring personnel who will later terminate employment due to non-adaptability or unsuccessful performance represents a cost which might be minimized if more precise procedures could be developed to identify those individuals not likely to succeed at a later date. All branches of the armed services have been concerned with problems of adaptation. For over 15 years, research has been directed toward the development of a screening technique which could be used to identify recruits who are considered high-risk for problems in adaptation to the military environment (Flyer, 1959; Klieger, Dubuisson, & de Jung, 1961; Plag & Goffman, 1966). Some have investigated the efficiency of the psychiatric interview and general clinical assessment procedures in identifying potential maladaptive accessions (Jensen, 1961; Plag, 1964; Plag & Arthur, 1965; Plag, Arthur, & Phelan, 1970; Shoemaker, Drucker, & Kriner, 1974). Other investigators have focussed on the importance of pre-enlistment/biographical variables and their relationship to later performance and adjustment in the military (Flyer, 1959; Fischer, Ward, & Holdrege, 1960; Gordon & Bottenberg, 1962; Plag, 1962; Gunderson, 1963; Arthur, 1971). In several studies, various inventories developed for screening were evaluated for their effectiveness in predicting adjustment problems (Danielson & Clark, 1954; Jensen, 1961; Plag, 1962; Larson & Kristianson, 1969; Bucky & Edwards, 1974; LaChar, Sparks, & Larson, 1974).

Although the practical usefulness of these personality and biographical/attitudinal inventories has not been conclusively demonstrated, findings from these studies do indicate consistent relationships between variables such as level of education, age, and general intellectual level with overall military effectiveness (Flyer, 1959, 1963, 1964; Plag & Hardacre, 1964; Drucker & Schwartz, 1973; Boyd & Jones, 1973). Other factors such as problems in schooling, family stability, and arrest history were also found to predict effective performance (Plag, 1962; Plag & Goffman, 1966; Plag, Arthur, & Goffman, 1970; Arthur, 1971).

In 1972, Air Force medical personnel initiated a research project to develop a screening technique which could be used to identify recruits who are considered high-risk for problems in adaptation to the military environment (LaChar, Larson, & Sparks, 1974). For use in this project, LaChar et al. developed a 100-item self-report history opinion inventory (HOI) designed to tap dimensions of school adjustment, family stability, social orientation, emotional stability, bodily complaints, motivation and expectations for achievement, and response toward authority.

Using the inventory and criterion data obtained on approximately 15,000 male airmen during basic training, two predictive scales were developed from the HOI for future use in screening. The prediction of emotional instability (PEI) scale was designed to measure characteristics associated with emotional maladjustment; the prediction of drug use admission (PDA) scale was designed to measure those characteristics associated with the acknowledgment of previous drug usage. These two scales were then combined into an adaptation index (ADI), and an optimal cutoff score was determined which would classify recruits into one of two categories, normal or high-risk. Based on this ADI cutoff score, 12 percent of the sample population was labeled as high-risk for military adaptation. According to records maintained by LaChar et al. half of the high-risk group did, in fact, experience problems in adjustment during basic training, although their problems did not necessarily result in discharge from service. This high-risk group was composed of seven percent of the normal criterion group, 41 percent of the severe adjustment group and 47 percent of the drug discharge group.

Based on these results, it was concluded that prediction of initial adaptability to military service is possible, and that such screening could result in substantial savings to the Air Force in identifying personnel who require special treatment or who should be separated from service (LaChar et al., 1974). However, the criterion classifications used in the initial analyses were partially based on subjective clinical and instructor evaluations of the individual's behavior. Prior to consideration of such an instrument for use in the operational screening of Air Force accessions, it was considered advisable that further investigations of the history opinion inventory be accomplished using the objective criterion of in-service versus actual separation/discharge from service.

Objectives of the Current Analyses

The objectives of the current study were: (1) to follow up the accessions administered the history opinion inventory in basic military training in order to determine the accuracy of the HOI scores in predicting the criterion of in/out of service during the first two years after enlistment, and (2) to determine whether additional aptitudinal and biographical data might increase the effectiveness of the screening procedure.

II. METHOD

Subjects: The sample population consisted of 15,252 basic airmen who were administered the HOI during basic military training at Lackland AFB, Texas, from June through August 1972.

Procedure: The data files established by LaChar et al. were matched with the airman tape files maintained by the Computational Sciences Division, Air Force Human Resources Laboratory, to obtain aptitudinal, biographical and discharge data. A total of 160 cases in the original population did not match the official data files, which reduced the sample population to 15,092. It is not believed that the loss of these cases represents any bias in the remaining sample which would materially affect the results obtained.

Discharge status was determined by a standard designation number (i.e., loss code) which identified all personnel who had been separated or discharged from service during the first two years after enlistment.

Loss codes indicating a similar reason for separation or discharge from service were grouped together as shown in Table 1. Based on the specifc loss code indicated in an individual's official record, each individual in the sample population was assigned to one of the following mutually exclusive criterion groups:

1. *In-service* – this group consisted of 10,329 individuals who were still on active duty or had extended their original commitment as of September, 1974.

2. *Loss, normal separation* – this group of 658 included those individuals whose loss codes did not reflect any problem in adaptation, such as separation and transfer to AF Reserve.

3. *Loss, desirability indeterminate* – this group of 364 airmen included those categories of losses for personal/hardship reasons, death, release to enter an educational institution, and release for the convenience of the Government.

4. *Loss, physical reasons* – this group of 457 individuals included all separations/retirements due to physical disability, obesity, and failure to meet medical fitness standards at time of enlistment.

5. *Loss, unsuitability* – a total of 371 airmen comprised this classification of undesirable loss. Major reasons for discharge included character and behavior/personality disorders, drug abuse, and sexual deviation.

6. *Loss, marginal productivity* – this group of 853 airmen included discharges due to minimal or marginal productivity and unsuitability due to apathy, defective attitudes and inability to expend effort constructively.

7. *Loss, disqualified for retention* – this group of 1,828 individuals was discharged based on their failure to meet minimum requirements for retention in the Air Force.

8. *Loss, unfitness* – the 156 individuals in this group were discharged for reasons of unfitness or misconduct; i.e., frequent involvement in incidents of a discreditable nature with civil or military authorities, conviction by civil court/court martial, AWOL/desertion.

9. *Loss, miscellaneous undesirable* – the remaining 77 individuals assigned to this group included those released for reasons which were considered under a miscellaneous category of undesirable; e.g., being a conscientious objector or for the good of the service.

The nine loss categories were then combined to form three additional criterion classifications: out-of-service, loss-not undesirable, and loss-undesirable. The out-of-service group was comprised of all individuals separated or discharged from service regardless of cause. Individuals in the loss-not undesirable

Table 1. **Criterion Groups**

Criterion Group Number	Criterion Group Description	Description of Loss Codes Included in Criterion Group	Specific Code Designations Included in Criterion Group	Total Number of Individuals in Criterion Group
1	In Service			10,329
		Active Duty Personnel	001, 006, 008, 011, 012, 013, 014 020, 023, 030, 900, 902, 907, 909	10,329
2	Loss, Normal Separation			658
		Normal Separation/Release	KBK, MBK, MBN, 203, 424, 715, 716	621
		Officer Program	KGM, KGX, MGX, 21P, 211, 214	37
3	Loss, Desirability Indeterminate			364
		Death	474	32
		Educational Release	KCF, MCF, 413	4
		Non-fulfillment of Enlistment Guarantee	KDQ, 377	11
		Personal Reasons	KND, MND, 21L	60
		Hardship	KDB, 227	252
		Erroneous Enlistment	319	1
		Convenience of the Government	711, 712, 713	4
4	Loss, Physical Reasons			457
		Obesity	GFT, HFT, 41E	15
		Physical Retirement	SFK, 270, 271	45
		Physical Problems, EPTS	JFM, JFL, 277, 278	88
		Physical Problems, Attrition	273	19
		Physical Problems, PETS/Medical Fitness	375	290
5	Loss, Unsuitability			371
		Unsuitability	247, 248	15
		Drugs	GMM, HLF, 384, 720, 721	25
		Substandard Personal Behavior	301	1
		Personality Disorder	HMB, JMB	3
		Character and Behavior Disorder	264, 265	313
		Sexual Deviation	GLL, HLC, HML, 253, 257, 361, 388, 46B	12
		Enuresis	263	1

Table 1 (Continued)

Criterion Group Number	Criterion Group Description	Description of Loss Codes Included in Criterion Group	Specific Code Designations Included in Criterion Group	Total Number of Individuals in Criterion Group	
6	Loss, Marginal Productivity				853
		Inaptitude	260, 261	10	
		Minimally Productive	JGH, JGZ, 703	606	
		Unsuitability-Apathy	HMJ, 46A, 46C	236	
		Unfitness, Shirking	HLJ	1	
7	Loss, Disqualified for Retention				1,828
		Failure to Meet Minimum Requirements for Retention	41G	1,828	
8	Loss, Unfitness				156
		Unfitness	258	1	
		Unfitness, Discreditable Behavior	GLB, HLB, 28B	92	
		Misconduct-Civil Court Action	GKB, HKB, 284	26	
		Desertion, AWOL	DFS, JJC, KFS, 282, 490, 491	25	
		Court-Martial	JJD, 292	12	
9	Loss, Miscellaneous Undesirable Reasons				77
		Conscientious Objector	KCM, 318	21	
		Fraudulent Enlistment	280	8	
		Financial Irresponsibility	28E	4	
		Good of Service	242, 246	44	
Total					15,093

group were those assigned to one of the three following loss categories: normal separations, loss-desirability indeterminate, or loss-physical reasons. The final group, loss-undesirable, included the loss categories of unsuitability, marginal productivity, disqualified for retention, unfitness, and miscellaneous-undesirable.

Scoring of the HOI response data and the cutoff scores used in the current study are those previously established by LaChar et al., 1974.

The actual items, scoring used in deriving the HOI scale scores, and estimates of scale reliability are presented in Tables A1 and A2 in Appendix A. The weighted linear combination of the two scales used to derive the adaptation index was .6568 of the PEI scale value and .7541 of the PDA scale value. The decision rules (cutoff scores) based on the optimum value which differentiated between recruits who would and would not have problems in basic training were as follows: PEI – 7.5 scale value; PDA – 11.5 scale value; ADI – 12.5 scale value.

Distributional analyses of HOI scale scores were accomplished to determine the number of individuals scoring at each score interval on the three scales. Based on cutoff scores for the HOI scales, the percentage of individuals in each criterion group identified as high-risk for problems in adaptation was tabulated.

Comparisons between the means of the in-service group and the different loss groups were accomplished, and the differences between means were tested for statistical significance by means of t-tests. Error rate for these comparisons was controlled per hypothesis; i.e., a total Type 1 error rate of .05 was considered acceptable.

Correlations were also computed to indicate the relationships between HOI scores and the various in/out criterion categories. Finally, regression analyses were accomplished to determine the usefulness of biographical and aptitudinal data in predicting adaptability to military service, and whether these data significantly increase accuracy in prediction over and above the use of the HOI scores alone.

III. RESULTS AND DISCUSSION

The means and standard deviations of the HOI scores by criterion classification are presented in Table 2. Results of the t-tests between the means of the in-service group and the loss groups, summarized in Table 3, indicate the differences between the means are quite similar for the three scales. In a majority of comparisons, the in-service group mean differs significantly from the loss/out-of-service means on all scales. However, mean comparisons between in-service and normal separations and between in-service and loss-desirability indeterminate were not significant across all scales. For the PEI scale, comparisons of mean differences between the in-service group and the unfitness and miscellaneous-undesirable groups were also non-significant.

Table 2. **Means and Standard Deviations of Scale/Index Scores – Original Sample**

Criterion Group	Valid N	PEI Scale		PDA Scale		Adaptation Index	
		Mean	SD	Mean	SD	Mean	SD
In Service	10,329	3.03	2.42	5.20	3.46	5.91	3.80
Out of Service	4,764	4.16	3.51	7.46	5.25	8.35	5.93
Loss, Not Undesirable	1,479	3.35	2.98	5.56	4.14	6.39	4.78
Normal separation	658	3.15	2.60	5.33	3.56	6.09	4.03
Desirability Indeterminate	364	3.14	2.83	5.40	3.81	6.13	4.41
Physical Reasons	457	3.80	3.52	6.03	5.04	7.04	5.83
Loss, Undesirable	3,285	4.53	3.67	8.32	5.47	9.24	6.18
Unsuitability	371	4.05	2.95	7.37	4.09	8.22	4.55
Marginal Productivity	853	3.30	2.66	7.05	4.07	7.48	4.40
Disqualified – Retention Stds	1,828	5.37	4.08	9.25	6.21	10.50	7.02
Unfitness	156	3.19	2.47	7.15	3.81	7.49	4.11
Miscellaneous – Undesirable	77	3.10	2.32	7.17	4.54	7.44	4.55

Table 3. Results of t-Tests Between In-Service and Loss Category Means – Original Sample

Mean Comparisons	t-ratio		
	PEI	PDA	ADI
In/out of service	23.00**	31.35**	30.43**
In/loss, not undesirable	4.62**	3.62**	4.39**
In/loss, normal separations	1.26[a]	.88[a]	1.12[a]
In/loss, desirability indetm	.85[a]	1.05[a]	1.07[a]
In/ioss, physical reasons	6.53**	4.87**	6.04**
In/loss, undesirable	26.97**	38.48**	36.94**
In/loss, unsuitability	7.92**	11.76**	11.38**
In/loss, marginal productivity	3.16*	14.76**	11.46**
In/loss, disqualified for retention	33.71**	39.87**	40.70**
In/loss, unfitness	.84[a]	6.98**	5.14**
In/loss, misc undesirable	.28[a]	4.95**	3.52**

[a]Not significant.
*Significant at .05 level.
**Significant at .01 level.

The correlations of the HOI scales for the various criterion group classifications are presented in Table 4. Those undesirable categories containing a sufficient number of individuals to assure some stability of results were used separately to indicate the effectiveness of the scales in differentiating between those in-service and those discharged for a specific reason. All correlations are statistically significant at or beyond the .01 level. The absolute value of the correlations reported may be somewhat inflated since a portion of the sample had been previously used for scale construction. However, the degree of inflation can be considered minimal based on the large sample size and the fact that the present criterion groups were not used in the actual scale development. Although significant, the observed relationship between HOI scores and the criterion groups comprising the marginal producers or unsuitable personnel appears negligible from a practical standpoint. A definite but low to moderate relationship is evident for the remaining criterion groups. It should also be noted that the correlations obtained on a sample population previously screened by operational selection tests are somewhat lower than if they had been computed on an unrestricted population.

Table 4. Zero Order Correlations[a] – Original Sample

Criterion Groups	HOI Scores		
	PEI	PDA	ADI
In/out	.2022	.2735	.2659
In/total loss, undesirable	.2241	.3122	.3013
In/loss, marginal productivity	.0296	.1378	.1072
In/loss, disqualified for retention	.2910	.3387	.3448
In/loss, unsuitability	.0763	.1131	.1093

[a]All correlations significant at .01 level.

The statistical significance of a measure often fails to reflect the practical usefulness of any screening device. An assessment of HOI utility can be made by a comparison of the number of personnel correctly identified (i.e., hits) versus the number of individuals incorrectly classified (i.e., false positives and misses). Hits include all personnel identified as normal who are still in service and those identified as high-risk who have been discharged from service. False positives include those individuals still in service who were identified by the HOI as high-risk and misses include those losses classified as normal. Table 5 shows the frequency and percent of each criterion group identified as normal or high-risk using the decision rules established by LaChar in 1974. Cumulative percentage distributions indicating the number of individuals at each score interval for the three HOI scales are also presented in Tables A3 through A5 in Appendix A. Overall, 11 percent of the total sample used in these analyses was identified as high-risk by the PDA and ADI scales; nine percent by the PEI scale. Six percent of the in-service group was identified as high-risk by each of the three decision rules for the HOI scales. The scales vary somewhat in the percentage of the loss categories identified as high-risk. Using the PEI scale, 18 percent of all losses and 21 percent of the undesirable losses were identified as high-risk; with the PDA scale, 22 percent of all losses, 28 percent of the undesirable losses; with the ADI index, 23 percent of all losses, 28 percent of the undesirable category. A closer review of the high-risk subgroup identified by the PDA or ADI scales shows that over 60 percent were actually discharged from service and over 55 percent for reasons of undesirability (Table 6). It appears that the PDA is almost as effective as the ADI index in identifying personnel who are separated or discharged from service. If similar results are found in future validation of the HOI, consideration should be given to simplifying the scoring process by using a single scale score for screening instead of the weighted ADI index.

Since the sample population entered service, enlistment standards have become more stringent. Today's accessions must meet three criteria: (1) each individual must obtain a total score of 170 or higher on the four combined aptitude indexes of the Armed Services Vocational Aptitude Battery; (2) their General Aptitude Index score must be 45 or higher; and (3) if they receive a mental classification of Category III or IV on the Armed Forces Qualifying Test, they must be a high school graduate. To give some insight into the effectiveness of the personality scales of the HOI on a population similar to current enlisted accessions, identical analyses on only those recruits meeting the new enlistment standards were performed. The actual number in each category qualifying on the multiple standards is shown in Table 7.

Descriptive statistics for the HOI scales on this restricted population are presented in Table 8 with the results of the comparisons between the means in Table 9. Results of the analysis of differences between the means between in-service personnel and out-of-service categories were similar to those in the original sample. Statistical comparisons of PEI mean differences between in-service personnel and each of the loss categories reflected significant differences in all comparisons except those involving normal separations, losses with desirability indeterminate, marginal productivity, unfitness and miscellaneous-undesirable losses. For PDA and ADI mean comparisons, differences between in-service personnel and two of the loss groups, normal separations and losses-desirability indeterminate were not significant. In addition, the in-service ADI mean did not differ significantly from the miscellaneous-undesirable losses. All other comparisons of means on the three scales were significant at or beyond the .05 level.

Some decrease in the absolute magnitude of the correlations between HOI scores and criterion categories is also evident in the restricted population (Table 10). Although the observable relationships are attenuated by the restriction of range imposed by the new enlistment criteria, the low to moderate correlations are still statistically significant.

The proportion of individuals identified as high-risk by the decision rules of the HOI scales differ slightly from the original sample as shown in Table 11. The more detailed frequency and cumulative percentage distributions are contained in Tables A6 through A8 in Appendix A. Due to the more stringent selection standards, only 26 percent of the undesirable loss category was identified as high-risk compared to 28 percent in the original sample. However, it should be noted that 35 percent of the undesirable loss category would have been rejected prior to enlistment had the new criteria been prerequisite for entry into the Air Force in 1972. Of the number identified as high-risk by the PDA or ADI scale, over 50 percent were actually discharged for reasons of undesirability (Table 12).

Since certain biographical and aptitudinal data are available from an individual's official records at the time of entry into the Air Force, the use of these data would eliminate the administration of the HOI if such data were as effective as the HOI scales in identifying personnel who are discharged from service.

Table 5. **Frequency and Percent of Original Sample in Each Criterion Group by Scale/Index Cutoff Scores as Normal or High Risk**

Criterion Group	PEI Scale				PDA Scale				ADI Index			
	Normal <7.5		High Risk >7.5		Normal <11.5		High Risk >11.5		Normal <12.5		High Risk > 12.5	
	N	%	N	%	N	%	N	%	N	%	N	%
In service	9,752	94	577	6	9,768	95	561	5	9,715	94	614	6
Out of Service	3,926	82	838	18	3,717	78	1,047	22	3,671	77	1,093	23
Loss, Not Undesirable	1,333	90	146	10	1,347	91	132	9	1,319	89	160	11
Normal Separation	610	93	48	7	620	94	38	6	613	93	45	7
Desirability Indeterminate	334	92	30	8	336	92	28	8	329	90	35	10
Physical Reasons	389	85	68	15	391	86	66	14	377	83	80	17
Loss, Undesirable	2,593	79	692	21	2,370	72	915	28	2,352	72	933	28
Unsuitability	323	87	48	13	304	82	67	18	310	84	61	16
Marginal Productivity	787	92	66	8	718	84	135	16	736	86	117	14
Disqualified-Retention Stds	1,267	69	561	31	1,152	63	676	37	1,105	60	723	40
Unfitness	146	94	10	6	133	85	23	15	136	87	20	13
Miscellaneous-Undesirable	70	91	7	9	63	82	14	18	65	84	12	16
Total	13,678	91	1,415	9	13,485	89	1,608	11	13,386	89	1,707	9

Table 6. **Percent of Each Criterion Group Identified by Decision Rules as High Risk – Original Sample**

Criterion Group	PEI Scale High Risk >7.5		PDA Scale High Risk >11.5		ADI Index High Risk >12.5	
In Service	41		35		36	
Out of Service	59		65		64	
Loss, Not Undesirable		10		8		9
Normal Separation		3		2		2
Desirability Indeterminate		2		2		2
Physical Reasons		5		4		5
Loss, Undesirable		49		57		55
Unsuitability		3		4		4
Marginal Productivity		5		9		7
Disqualified-Retention Stds		40		42		42
Unfitness		1		1		1
Miscellaneous-Undesirable		0		1		1
Total	100		100		100	

Table 7. **Percent Screened by Current Enlistment Standards[a]**

Criterion Gp Number	Group Description	Enlistment Standard Composite[b] Qualified N	Qualified %	Disqualified N	Disqualified %
1	In Service	8,125	79	2,189	21
	Out of Service	3,233	68	1,523	32
	Loss, Not Undesirable	1,105	75	372	25
2	Normal Separation	525	80	132	20
3	Desirability Indeterminate	266	73	97	27
4	Physical Reasons	314	69	143	31
	Loss, Undesirable	2,128	65	1,151	35
5	Unsuitability	231	62	140	38
6	Marginal Productivity	541	63	311	37
7	Disqualified-Retention Stds	1,219	67	604	33
8	Unfitness	90	58	66	42
9	Misc - Undesirable	47	61	30	39
	Total	11,358	75	3,712	25

[a]To be qualified, individual must have a total of 170 for his combined aptitude index scores (M,A,G,E), a General Aptitude Index score of 45 or better, and Cat III and IV personnel must be high school graduates.

[b]Information required to determine enlistment standard composite was not available for 23 cases.

Table 8. **Means and Standard Deviations of Scale/Index Scores – Current Enlistment Standards Sample**

Criterion Group	Valid N	PEI Scale		PDA Scale		Adaptation Index	
		Mean	SD	Mean	SD	Mean	SD
In Service	8,125	2.93	2.36	5.00	3.33	5.69	3.67
Out of Service	3,233	3.98	3.42	7.06	5.01	7.94	5.69
Loss, Not Undesirable	1,105	3.16	2.85	5.33	3.93	6.09	4.49
Normal Separation	525	3.06	2.60	5.19	3.53	5.92	3.99
Desirability Indeterminate	266	2.83	2.62	5.10	3.63	5.68	4.12
Physical Reasons	314	3.60	3.34	5.77	4.71	6.71	5.44
Loss, Undesirable	2,128	4.41	3.61	7.96	5.27	8.12	4.51
Unsuitability	231	4.04	2.92	7.22	4.02	8.52	4.49
Marginal Productivity	541	3.14	2.61	6.76	3.95	7.17	4.27
Disqualified-Retention Stds	1,219	5.18	3.99	8.78	5.93	10.03	6.76
Unfitness	90	3.23	2.66	6.72	3.86	7.18	4.28
Miscellaneous-Undesirable	47	2.79	2.19	6.51	4.05	6.72	4.08

Table 9. **Results of t-Tests Between In-Service and Loss Category Means – Current Enlistment Standards Sample**

Mean Comparisons	t-ratio		
	PEI	PDA	ADI
In/out of service	18.69**	25.50**	24.89**
In/loss, not undesirable	2.96*	9.04**	3.28*
In/loss, normal separations	1.19[a]	1.27[a]	1.40[a]
In/loss, desirability indetm	.63[a]	.47[a]	.05[a]
In/loss, physical reasons	4.88**	3.92**	4.71**
In/loss, undesirable	22.74**	31.83**	30.92**
In/loss, unsuitability	7.03**	9.89**	9.85**
In/loss, marginal productivity	2.04[a]	11.73**	8.95**
In/loss, disqualified for retention	27.92**	32.61**	33.56**
In/loss, unfitness	1.22[a]	4.86**	3.81**
In/loss, misc undesirable	.41[a]	3.09*	1.92[a]

[a]Non-significant.

*Significant at the .05 level.

**Significant at the .01 level.

Table 10. **Zero Order Correlations[a] – Current Enlistment Standards Sample**

Criterion Groups	PEI	PDA	ADI
In/out	.1933	.2611	.2547
In/total loss, undesirable	.2188	.2997	.2915
In/loss, marginal productivity	.0219*	.1250	.0952
In/loss, disqualified for retention	.2771	.3192	.3276
In/loss, unsuitability	.0767	.1076	.1060

[a]All correlations except where noted significant at .01 level.

*Significant at the .05 level.

Table 11. Frequency and Percent of Current Enlistment Standards Personnel in Each Criterion Group Identified by Scale/Index Cutoff Scores as Normal or High Risk

Criterion Group	PEI Scale				PDA Scale				ADI Index			
	Normal ≤7.5		High Risk >7.5		Normal ≤11.5		High Risk >11.5		Normal ≤12.5		High Risk >12.5	
	N	%	N	%	N	%	N	%	N	%	N	%
In Service	7,730	95	395	5	7,756	95	369	5	7,715	95	410	5
Out of Service	2,713	84	520	16	2,610	81	623	19	2,573	80	660	20
Loss, Not Undesirable	1,011	91	94	9	1,022	92	83	8	1,007	90	98	10
Normal Separation	487	93	38	7	495	94	30	6	490	93	35	7
Desirability Indeterminate	250	94	16	6	250	94	16	6	246	92	20	8
Physical Reasons	274	87	40	13	277	88	37	12	271	86	43	14
Loss, Undesirable	1,702	80	426	20	1,588	75	540	25	1,566	74	562	26
Unsuitability	204	88	27	12	190	82	41	18	195	84	36	16
Marginal Productivity	503	93	38	7	468	87	73	13	481	89	60	11
Disqualified-Retention Stds	869	71	350	29	811	67	408	33	769	63	450	37
Unfitness	82	91	8	9	79	88	11	12	79	88	11	12
Miscellaneous-Undesirable	44	94	3	6	40	85	7	15	42	89	5	11
Total	10,443	92	915	8	10,366	91	992	9	10,288	91	1,070	9

Table 12. **Percent of Each Criterion Group Identified by Decision Rules as High Risk – Current Enlistment Standards Sample**

Criterion Group	PEI Scale High Risk >7.5		PDA Scale High Risk >11.5		ADI Index High Risk >12.5	
In Service	43		37		38	
Out of Service	57		63		62	
Loss, Not Undesirable	10		9		9	
Normal Separation		4		3		3
Desirability Indeterminate		2		2		2
Physical Reasons		4		4		4
Loss, Undesirable	47		54		53	
Unsuitability		3		4		3
Marginal Productivity		4		7		6
Disqualified-Retention Stds		38		41		42
Unfitness		1		1		1
Miscellaneous-Undesirable		1		1		1
Total	100		100		100	

Therefore, a series of regression analyses were accomplished on the originial and current enlistment standards samples to determine the usefulness of biographical and aptitudinal data alone or in combination with the HOI scales in predicting loss from active duty. Based on the similar percentage of out-of-service and undesirable loss personnel identified by the PDA scale in comparison to the PEI scale and the weighted ADI index, another series of analyses were accomplished to see if any significant loss in predictive accuracy would occur by using the PDA scale alone. Two criterion groupings were used for the regression analyses: in-service and out-of-service; in-service and total loss-undesirable. Multiple correlations for the various groups of predictors are given in Table 13. Summaries of these regression analyses are presented in Tables 14 and 15. The first regression comparison indicates that the aptitudinal and biographical data do add significantly to prediction over above the ADI index. On the other hand, however, the aptitudinal and biographical data cannot be used in lieu of the ADI scale; i.e., the ADI index does make a unique contribution in both criterion groupings. The comparison to determine whether the PDA scale contributes

Table 13. **Multiple Correlations[a]**

Criterion Grouping	Aptitudinal and Biographic data[b]	Aptitudinal, Bio and ADI	Aptitudinal, Bio, PDA, PEI	Aptitudinal, Bio, PDA
Original Sample				
In-service/out of service	.2149	.3127	.3158	.3150
In-service/loss-undesirable	.2303	.3459	.3506	.3500
Current Enlistment Standards				
In-service/out-of-service	.1475	.2778	.2816	.2805
In-service/loss-undesirable	.1600	.3130	.3176	.3165

[a] All correlations significant at or beyond .01 level.

[b] Aptitudinal data includes four aptitude index scores, AFQT score; biographical data includes age at enlistment and years of education.

Table 14. **Summary of Regression Analyses – Original Sample**

Criterion Grouping	R^2-Full Model	Predictors in Full Model	R^2-Restricted Model	Predictors in Restricted Model	df_1	df_2	F ratio
In/out of service	.0978	M, A, G, E, AFQT, Age, Years of Educ, ADI	.0707	ADI	7	15,083	61.87**
	.0978	M, A, G, E, AFQT, Age, Years of Educ, ADI	.0462	M, A, G, E, AFQT, Age, Years of Educ	1	15,083	824.56**
	.0750	ADI, PEI, PDA	.0748	PDA	2	15,088	1.07[a]
	.0993	M, A, G, E, AFQT, Age, Years of Educ, PDA	.0748	PDA	7	15,083	55.88**
In/loss, undesirable	.1197	M, A, G, E, AFQT, Age, Years of Educ, ADI	.0908	ADI	7	13,583	63.81**
	.1197	M, A, G, E, AFQT, Age, Years of Educ, ADI	.0530	M, A, G, E, AFQT, Age, Years of Educ	1	13,583	1029.83**
	.0975	ADI, PEI, PDA	.0975	PDA	2	13,588	.29[a]
	.1225	M, A, G, E, AFQT, Age, Years of Educ, PDA	.0975	PDA	7	13,583	55.54**

[a]Non-significant.

**Significant at the .01 level.

Table 15. **Summary of Regression Analyses – Current Enlistment Standards Sample**

Criterion Grouping	R^2-Full Model	Predictors in Full Model	R^2-Restricted Model	Predictors in Restricted Model	df_1	df_2	F ratio
In/out of service	.0772	M, A, G, E, AFQT, Age, Years of Educ, ADI	.0649	ADI	7	11,347	20.57**
	.0772	M, A, G, E, AFQT, Age, Years of Educ, ADI	.0217	M, A, G, E, AFQT, Age, Years of Educ	1	11,347	650.01**
	.0685	ADI, PEI, PDA	.0682	PDA	2	11,354	1.68[a]
	.0787	M, A, G, E, AFQT, Age, Years of Educ, PDA	.0682	PDA	7	11,347	17.58**
In/loss, undesirable	.0979	M, A, G, E, AFQT, Age, Years of Educ, ADI	.0849	ADI	7	10,243	21.10**
	.0979	M, A, G, E, AFQT, Age, Years of Educ, ADI	.0256	M, A, G, E, AFQT, Age, Years of Educ	1	10,243	821.73**
	.0901	ADI, PEI, PDA	.0898	PDA	2	10,248	1.59[a]
	.1001	M, A, G, E, AFQT, Age, Years of Educ, PDA	.0898	PDA	7	10,243	16.84**

[a]Non-significant.

**Significant at the .01 level.

as much as the combination of all HOI scales indicates the PDA scale can be effectively used alone. If the predictive efficiency of the PDA scale over the other HOI measures is found in future validation studies, the continued use of the PEI scale to form the weighted ADI index appears redundant and unnecessarily more complicated than a single score cutoff. The final comparison of squared multiple correlations was made to determine if the aptitudinal and biographical data still made a significant and unique contribution if the PDA scale were used alone. Results of this comparison indicate the aptitudinal and biographical data make a significant contribution to the PDA scale also.

In general, the value of implementing any screening procedure based on biographical, aptitudinal, or personality data must be carefully evaluated by considering the savings which would be accrued by early identification of maladaptive personnel versus the loss to the Air Force of potentially successful personnel who might be denied enlistment or separated prematurely from service. When the quantity and quality of the prospective recruit manpower pool are high, a coarse screening methodology can be cost-effective in saving the expenses of training, counseling, treatment, and administration associated with personnel who have adjustment problems even though it also identifies a sizeable proportion of potentially productive personnel. On the other hand, if the volume of prospective recruits is low, the number of potentially successful personnel identified as maladaptive becomes a critical issue.

Should a screening measure such as the HOI be considered for operational use, several additional procedures should be incorporated to safeguard against identifying and possibly rejecting a large number of potentially productive and successful military personnel. For example, counseling could be scheduled for all personnel exhibiting symptoms of initial maladjustment. Many problems might be transitory if professional guidance were made available during basic training. Secondly, additional in-depth assessment procedures should also be administered to high-risk personnel in an effort to identify those with major psychiatric/emotional problems who should be separated from service as soon as possible.

IV. CONCLUSIONS AND RECOMMENDATIONS

The correlations obtained for the HOI scales appear to indicate that the self-report data contained in the HOI has some practical usefulness as a rough, preliminary screening device. However, the small magnitude of the observed relationships necessitates careful review by professional personnel of all personnel identified as high-risk. In no instance should identification as high-risk by the HOI be used as the sole basis for any adverse personnel action. On the positive side, the HOI does identify a sizeable proportion of recruits who were actually discharged from service as undesirable during the first two years of active duty. Even under current enlistment standards, over 25 percent of the undesirable losses would have been labeled as high-risk. However, the overall savings which might be accrued from early identification of the high-risk group might be obscured by the costs of implementing a secondary assessment and counseling phase which is considered necessary with the use of a rough screening device such as the HOI.

Prior to the use of the HOI in an operational setting, the following recommended courses of action are considered mandatory.

a. Revalidate the HOI on accessions under current enlistment standards to determine its effectiveness and stability on a new population. In the original sample, a large number of personnel who were discharged for admission to prior drug usage were used for scale construction. Although the PDA scale appears to be quite effective in identifying all types of undesirable losses, the appropriateness of the original scales or cutoff scores developed on that population may be questionable if a decrease in the number of drug discharges has occurred during the past two years.

b. While results obtained on the original sample suggest that such a screening procedure might be used effectively, the population consisted of male accessions only. Prior to using the HOI as a screening device on a female population, additional research must be accomplished to establish the applicability of the scales and cutting scores on a WAF population.

c. It is further recommended that use of this screening device should be limited to preliminary screening only and that additional psychometric and/or psychiatric assessment be mandatory before any personnel action is recommended. Every effort should be made to retain as many of the potentially successful personnel in the high-risk category as possible.

d. To simplify the administrative scoring of the HOI, it is recommended that further research on this instrument investigate the possibility of developing one scale rather than the complex weighing process used for deriving the ADI index score.

e. Based on the preliminary regression analyses, additional aptitudinal and biographical data which is available on all recruits should be considered in combination with HOI data to improve the accuracy in identification of maladaptive personnel.

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APPENDIX A: DISTRIBUTION OF SCALE SCORES

Table A1. **PEI Scale – Emotional Instability**

	Item	Response scored as +1
1.	I have needed help for emotional problems.	T
2.	At one time I needed medication to stay calm.	T
3.	For a long time I have had difficulty sleeping.	T
4.	I often have headaches.	T
5.	I have cried several times this past year.	T
6.	I usually take things hard.	T
7.	I enjoyed physical education.	F
8.	I have had more than my share of illness.	T
9.	I needed special help with my school studies.	T
10.	I am joining the Air Force to get a better education.	F
11.	I would rather work by myself than with others.	T
12.	I was a slow learner in school.	T
13.	I would rather read than be with people.	T
14.	I entered the service (AF) because there was nothing else to do.	T
15.	I do not mind orders and being told what to do.	F
16.	As a child I was a loner.	T
17.	My father is (was) a nervous man.	T
18.	I never cared much for school.	T

Note. – KR-20 scale reliability: .716

Table A2. **PDA Scale – Drug Use Admission**

	Item	Response Scored as +1
1.	I often played hookey from school.	T
2.	I quit school because I lost interest.	T
3.	I feel better when I drink.	T
4.	For a long time I have had difficulty sleeping.	T
5.	I think I will make the Air Force a career.	F
6.	I am joining the Air Force to get a better education.	F
7.	I never cared much for school.	T
8.	I have been in trouble with the police.	T
9.	I was suspended from school more than two times.	T
10.	I have often gone against my parents' wishes.	T
11.	I do not mind orders and being told what to do.	F
12.	I often have headaches.	T
13.	I entered the service (AF) because there was nothing else to do.	T
14.	I had my share of trouble with teachers.	T
15.	I was expelled or suspended from school.	T
16.	At one time I needed medication to stay calm.	T
17.	I have never done any heavy drinking.	F
18.	I enjoyed physical education.	F
19.	I quit school because I was failing.	T
20.	I have been expelled from school more than once.	T
21.	I have been arrested more than twice.	T
22.	High school was boring.	T
23.	I often cuss and swear.	T
24.	I plan to attend college.	F
25.	I sometimes wanted to run away from home.	T
26.	I have needed help for emotional problems.	T

Note. – KR-20 scale reliability: .803

Table A3. **Frequency and Cumulative Percentage Distributions of PEI Scores by Criterion Group – Original Sample**

PEI Scores	Criterion Groups																					
	In Service		Out of Service		Total Loss, Not Undes		Normal Separation		Loss, Des Undetm		Loss, Physical		Total Loss, Undes		Loss, Unsuit		Loss, Marg Prod		Loss, Disqual Retn		Loss, Unfit		Loss, Misc Undes	
	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %
00	1,239	100	716	100	241	100	85	100	49	100	107	100	475	100	34	100	95	100	323	100	18	100	5	100
01	1,898	88	576	85	231	84	125	87	69	87	37	77	345	86	48	91	158	89	90	82	31	88	18	94
02	1,952	69	598	73	241	68	110	68	78	68	33	68	357	75	52	78	137	70	131	77	22	69	15	70
03	1,635	51	514	60	187	52	92	51	50	46	45	57	327	64	41	64	124	54	126	70	23	54	13	51
04	1,229	35	470	50	151	39	71	37	28	32	52	47	319	54	52	53	102	40	138	63	21	40	6	34
05	866	23	443	40	127	29	64	27	20	25	43	36	316	45	38	39	86	28	169	56	14	26	9	26
06	579	15	329	30	92	20	41	17	21	19	30	26	237	35	38	29	51	18	138	47	7	17	3	14
07	354	9	280	23	63	14	22	11	19	13	22	20	217	28	20	18	34	12	152	39	10	13	1	10
08	229	6	237	18	45	10	20	7	10	8	15	15	192	21	14	13	25	8	142	31	6	6	5	9
09	147	3	169	13	29	7	9	4	7	5	13	12	140	15	16	9	14	5	106	23	2	3	2	3
10	94	2	144	9	29	5	11	3	4	4	14	9	115	11	7	5	10	3	97	17	1	1	0	
11	59	1	92	6	12	3	2	1	1	2	9	6	80	7	1	3	9	2	70	12	0	1	0	
12	24		74	4	14	2	4	1	4	2	6	4	60	5	7	3	3	1	49	8	1	1	0	
13	11		49	3	10	1	1		2	1	7	2	39	3	2	1	1	1	36	5	0		0	
14	8		38	2	4		1		2	1	1	1	34	2	1		3	1	30	3	0		0	
15	2		19	1	1		0		0		1	1	18	1	0		1		17	2	0		0	
16	2		10		0		0		0		0		10		0		0		10	1	0		0	
17	1		5		2		0		0		2		3		0		0		3		0		0	
18	0		1		0		0		0		0		1		0		0		1		0		0	
Total N	10,329		4,764		1,479		658		364		457		3,285		371		853		1,828		156		77	

Table A4. **Frequency and Cumulative Percentage Distributions of PDA Scores by Criterion Group -- Original Sample**

PDA Scores	Criterion Groups																					
	In Service		Out of Service		Total Loss, Not Undes		Normal Separation		Loss, Des Undetm		Loss, Physical		Total Loss, Undes		Loss, Unsuit		Loss, Marg Prod		Loss, Disqual Retn		Loss, Unfit		Loss, Misc Undes	
	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %
00	400	100	446	100	135	100	27	100	18	100	90	100	311	100	7	100	15	100	282	100	5	100	2	100
01	876	96	181	91	105	91	56	96	29	95	20	80	76	91	12	98	35	98	21	85	5	97	3	97
02	1,251	88	269	87	141	84	78	87	42	87	21	76	128	88	21	95	62	94	28	83	12	94	5	94
03	1,243	76	307	81	141	74	71	76	41	76	29	71	166	84	33	89	61	87	58	82	7	86	7	87
04	1,239	64	361	75	154	65	80	65	41	64	33	65	207	79	34	80	81	80	70	79	12	81	10	78
05	1,104	52	375	67	149	54	67	53	46	53	36	58	226	73	25	71	96	70	87	75	9	74	9	65
06	1,042	41	350	59	135	44	64	42	34	40	37	50	215	66	38	64	81	59	75	70	16	68	5	53
07	804	31	322	52	99	35	48	33	19	31	32	42	223	60	30	54	71	49	102	66	19	58	1	47
08	658	23	337	45	106	28	47	25	23	26	36	35	231	53	30	46	69	41	106	60	18	46	8	45
09	478	17	305	38	82	21	33	18	24	20	25	27	223	46	32	38	57	33	111	55	17	34	6	35
10	403	12	256	32	58	16	31	13	14	13	13	21	198	39	23	29	51	26	112	49	7	23	5	27
11	270	8	208	26	42	12	18	9	5	9	19	19	166	33	19	23	39	20	100	42	6	19	2	21
12	188	5	201	22	31	9	17	6	4	8	10	14	170	28	25	18	34	16	101	37	8	15	2	18
13	128	4	180	18	26	7	5	3	7	7	14	12	154	23	18	11	34	12	94	31	5	10	3	16
14	93	3	149	14	22	5	8	2	6	5	8	9	127	18	10	6	30	8	79	26	5	6	3	12
15	57	1	120	11	18	4	1	1	6	3	11	7	102	14	4	4	15	4	81	22	1	3	1	8
16	37	1	105	8	15	2	2	1	3	1	10	5	90	11	3	3	9	3	72	18	3	3	3	6
17	23	1	75	6	4	1	2	1	0	1	2	3	71	8	1	2	6	2	62	14	1	1	1	3
18	19		60	5	7	1	1		1	1	5	2	53	6	3	2	1	1	49	10	0		0	1
19	10		42	3	1	1	1		0		0	1	41	5	2	1	2	1	37	8	0		0	1
20	5		38	2	3	1	0		0		3	1	35	3	0		3		32	6	0		0	1
21	0		28	2	0		0		0		0	1	28	2	0		0		27	4	0		1	1
22	0		21	1	0		0		0		0	1	21	1	0		0		21	2	0		0	
23	1		17	1	1		0		0		1	1	16	1	0		1		15	1	0		0	
24	0		7		2		1		1		0		5		1		0		4		0		0	
25	0		3		2		0		0		2		1		0		0		1		0		0	
26	0		1		0		0		0		0		1		0		0		1		0		0	
Total N	10,329		4,764		1,479		658		364		457		3,285		371		853		1,828		156		77	

Table A5. **Frequency and Cumulative Percentage Distributions of ADI Scores by Criterion Group – Original Sample**

ADI Scores	Criterion Groups																							
	In Service		Out of Service		Total Loss, Not Undes		Normal Separation		Loss, Des Undetm		Loss, Physical		Total Loss, Undes		Loss, Unsuit		Loss, Marg Prod		Loss, Disqual Retn		Loss, Unfit		Loss, Misc Undes	
	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %
00	168	100	405	100	108	100	13	100	9	100	86	100	297	100	3	100	11	100	280	100	3	100	0	100
01	755	98	160	91	97	93	53	98	25	98	19	81	63	81	10	99	29	99	14	85	6	98	4	100
02	1,054	91	235	88	119	86	64	90	43	91	12	77	116	39	20	96	51	95	26	84	12	94	7	95
03	1,045	81	257	83	128	78	70	80	36	79	22	74	129	86	23	91	58	89	37	82	6	87	5	86
04	1,418	71	400	78	163	69	80	70	53	69	30	70	237	82	36	85	104	83	72	80	16	83	9	79
05	890	57	255	69	96	58	40	57	32	54	24	63	159	74	23	75	62	70	63	77	7	72	4	68
06	1,218	48	372	64	145	52	74	51	32	45	39	58	227	70	36	69	92	63	72	73	19	68	8	62
07	814	37	322	56	125	42	59	40	28	37	38	49	197	63	22	59	83	52	67	69	17	56	8	52
08	636	29	276	49	93	34	47	31	17	29	29	41	183	57	33	53	59	43	77	65	9	45	5	42
09	622	23	289	44	80	27	34	24	19	24	27	35	209	51	28	44	50	36	112	61	14	39	5	36
10	427	17	237	38	58	22	30	19	11	19	17	29	179	45	24	37	49	30	92	55	12	30	2	29
11	406	12	272	33	76	18	31	14	20	16	25	25	196	39	28	30	57	24	102	50	7	22	2	26
12	262	9	191	27	31	13	18	10	4	11	9	19	160	33	24	23	31	17	91	45	8	18	6	23
13	177	6	157	23	26	11	10	7	7	10	9	17	131	28	16	16	26	14	78	40	7	13	4	16
14	136	4	193	20	37	9	10	5	6	8	21	16	156	24	12	12	28	11	106	35	7	8	3	10
15	68	3	116	16	17	7	5	4	7	6	5	11	99	20	5	9	19	7	74	29	0	4	1	6
16	89	2	114	14	20	5	7	3	4	4	9	10	94	17	14	8	12	5	65	25	3	4	0	6
17	43	1	118	11	20	4	6	2	3	3	11	8	98	14	2	4	14	4	79	22	1	2	2	5
18	29	1	71	8	10	3	3	1	2	2	5	5	61	11	4	3	5	2	51	18	1	1	0	5
19	32	1	80	7	5	2	1	1	1	2	3	4	75	9	1	2	7	2	66	15	0	1	1	3
20	11		56	5	6	2	1		2	1	3	4	50	7	2	2	0	1	48	11	0	1	0	1
21	14		58	4	9	1	0		2	1	7	3	49	5	4	1	0	1	43	9	1	1	1	1
22	9		30	3	1	1	0		0		1	2	29	4	0		1	1	28	6	0		0	
23	2		35	2	4	1	1		0		3	1	31	3	0		1	1	30	5	0		0	
24	1		26	1	0		0		0		0	1	26	2	0		3		23	3	0		0	
25	3		9	1	0		0		0		0	1	9	1	0		0		9	2	0		0	
26	0		14	1	2		1		0		1	1	12	1	0		0		12	1	0		0	
27	0		8		1		0		1		0		7		1		1		5	1	0		0	
28	0		2		0		0		0		0		2		0		0		2		0		0	
29	0		5		1		0		0		1		4		0		0		4		0		0	
30	0		1		1		0		0		1		0		0		0		0		0		0	
Total N	10,329		4,764		1,479		658		364		457		3,285		371		853		1,828		156		77	

Table A6. **Frequency and Cumulative Percentage Distributions of PEI Scores by Criterion Group for Individuals Qualifying Under Current Enlistment Standards**

PEI Scores	Criterion Groups																							
	In Service		Out of Service		Total Loss, Not Undes		Normal Separation		Loss, Des Undetm		Loss, Physical		Total Loss, Undes		Loss, Unsuit		Loss, Marg Prod		Loss, Disqual Retn		Loss, Unfit		Loss, Misc Undes	
	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %
00	1,029	100	503	100	179	100	71	100	39	100	69	100	324	100	22	100	68	100	218	100	13	100	3	100
01	1,553	87	424	84	194	84	111	86	52	85	31	78	230	85	29	90	107	87	65	82	16	86	13	94
02	1,552	68	420	71	190	66	86	65	64	66	40	68	230	74	31	78	85	68	90	77	13	68	11	66
03	1,269	49	353	58	142	49	72	49	36	41	34	55	211	63	22	64	76	52	94	69	13	53	6	43
04	958	34	320	47	108	36	48	35	22	28	38	45	212	53	36	55	71	38	90	62	10	39	5	30
05	656	21	292	38	91	26	50	26	13	20	28	33	201	43	26	39	47	25	117	54	7	28	4	19
06	448	14	223	28	66	18	33	17	13	15	20	23	157	34	24	28	29	16	98	45	5	20	1	11
07	265	8	178	22	41	12	16	10	11	10	14	17	137	26	14	18	20	11	97	37	5	14	1	9
08	159	5	155	16	29	9	14	7	6	6	9	13	126	20	10	12	15	7	94	29	5	9	2	6
09	100	3	106	11	24	6	9	5	5	4	10	10	82	14	7	7	6	4	66	25	2	3	1	2
10	63	2	87	8	17	3	9	3	0	2	8	7	70	10	2	4	7	3	61	16	0	1	0	
11	42	1	57	5	7	2	2	1	0	2	5	4	50	7	1	3	5	2	44	11	0	1	0	
12	14		45	4	8	2	4	1	2	2	2	3	37	5	5	3	3	1	28	7	1	1	0	
13	8		30	2	4	1			1	1	3	2	26	3	1	1	1		24	5	0		0	
14	6		19	1	3				2	1	1	1	16	2	1		1		14	3	0		0	
15	2		11	1							0	1	11	1	0		0		11	2	0		0	
16	1		5								0	1	5		0		0		5	1	0		0	
17	0		4		2						2	1	2		0		0		2		0		0	
18	0		1										1		0		0		1		0		0	
Total N	8,125		3,233		1,105		525		266		314		2,128		231		541		1,219		90		47	

Table A7. **Frequency and Cumulative Percentage Distributions of PDA Scores by Criterion Group for Individuals Qualifying Under Current Enlistment Standards**

PDA Scores	Criterion Groups																							
	In Service		Out of Service		Total Loss, Not Undes		Normal Separation		Loss, Des Undetm		Loss, Physical		Total Loss, Undes		Loss, Unsuit		Loss, Marg Prod		Loss, Disqual Retn		Loss, Unfit		Loss, Misc Undes	
	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %
00	330	100	303	100	93	100	24	100	13	100	56	100	210	100	3	100	12	100	189	100	4	100	2	100
01	730	96	134	91	90	92	51	95	23	95	16	82	44	90	7	99	19	98	15	84	2	95	1	96
02	1,032	87	202	86	108	83	61	86	32	86	15	77	94	88	15	96	46	94	21	83	9	93	3	94
03	1,011	74	232	80	112	74	55	74	34	74	23	72	120	84	24	89	43	86	44	82	4	83	5	87
04	1,019	62	259	73	118	64	65	64	29	62	24	65	141	78	24	79	52	78	51	78	6	79	8	77
05	868	49	271	65	119	53	54	51	35	51	30	57	152	71	14	68	62	68	63	74	8	72	5	60
06	819	39	255	57	105	42	52	41	27	38	26	48	150	64	21	62	56	57	59	69	11	63	3	49
07	610	29	213	49	67	33	31	31	13	27	23	39	146	57	21	53	46	46	67	64	12	51	0	43
08	489	21	237	42	84	26	40	25	17	23	27	32	153	50	20	44	42	38	75	58	9	38	7	43
09	369	15	200	35	62	19	27	18	17	16	18	24	138	43	18	35	32	30	75	52	9	28	4	28
10	288	10	169	29	39	13	22	12	8	10	9	18	130	37	11	28	34	24	80	46	3	18	2	19
11	191	7	135	23	25	10	13	8	2	7	10	15	110	31	12	23	24	18	72	39	2	14	0	15
12	129	5	128	19	22	8	14	6	2	6	6	12	106	25	16	18	21	13	64	33	4	12	1	15
13	91	3	111	15	16	6	5	3	3	5	8	10	95	20	9	11	16	10	67	28	1	8	2	13
14	57	2	99	12	16	4	7	2	5	4	4	7	83	16	8	7	18	7	53	23	2	7	2	9
15	42	1	70	9	10	3	0	1	4	2	6	6	60	12	2	3	5	3	52	18	0	4	1	4
16	23	1	62	7	9	2	2	1	1	1	6	4	53	9	2	3	4	2	43	14	3	4	1	2
17	12		45	5	1	1	1		0		0	2	44	7	1	2	5	2	37	11	1	1	0	
18	8		33	3	4	1	0		0		4	2	29	5	2	1	1	1	26	8	0		0	
19	5		23	2	0		0		0		0	1	23	3	1		1	1	21	5	0		0	
20	2		18	2	2		0		0		2	1	16	2	0		2		14	4	0		0	
21	0		10	1	0		0		0		0		10	1	0		0		10	3	0		0	
22	0		11	1	0		0		0		0		11	1	0		0		11	2	0		0	
23	0		10		0		0		0		0		10		0		0		10	1	0		0	
24	0		2		2		1		1		0		0		0		0		0		0		0	
25	0		1		1		0		0		1		0		0		0		0		0		0	
26	0		0		0		0		0		0		0		0		0		0		0		0	
Total N	8,125		3,233		1,105		525		266		314		2,128		231		541		1,219		90		47	

Table A8. **Frequency and Cumulative Percentage Distributions of ADI Scores by Criterion Group for Individuals Qualifying Under Current Enlistment Standards**

ADI Scores	Criterion Groups																							
	In Service		Out of Service		Total Loss, Not Undes		Normal Separation		Loss, Des Undetm		Loss, Physical		Total Loss, Undes		Loss, Unsuit		Loss, Marg Prod		Loss, Dis-qual Retn		Loss, Unfit		Loss, Misc Undes	
	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %	N	Cum %
00	136	100	268	100	68	100	10	100	5	100	53	100	200	100	2	100	9	100	187	100	2	100	0	100
01	640	98	127	92	85	94	49	98	21	98	15	83	42	91	5	99	19	98	11	85	4	98	3	100
02	868	90	172	88	99	86	54	89	36	90	9	78	73	89	12	97	34	95	16	84	7	93	4	94
03	865	80	194	82	102	77	57	78	29	77	16	76	92	85	16	92	40	89	30	82	2	86	4	85
04	1,160	69	287	76	121	68	62	68	35	66	24	70	166	81	25	85	69	81	51	80	14	83	7	77
05	698	55	198	68	80	57	35	56	24	53	21	63	118	73	15	74	47	68	48	76	5	68	3	62
06	979	46	266	61	111	50	55	49	26	44	30	56	155	68	23	68	61	60	54	72	13	62	4	55
07	598	34	222	53	102	40	49	39	25	34	28	47	120	60	14	58	44	48	50	67	7	48	5	47
08	497	27	185	46	68	30	33	29	15	25	20	38	117	55	17	52	37	40	56	63	4	40	3	36
09	470	21	191	41	53	24	24	23	13	19	16	31	138	49	20	44	34	33	74	59	6	36	4	30
10	314	15	143	35	39	20	23	18	3	14	13	26	104	43	13	35	30	27	55	53	6	29	0	21
11	301	11	195	30	57	16	25	14	12	13	20	22	138	38	18	30	39	22	76	48	4	22	1	21
12	189	7	125	24	22	11	14	9	2	8	6	16	103	31	15	22	18	14	61	42	5	18	4	19
13	122	5	95	20	17	9	9	7	5	8	3	14	78	26	10	16	11	11	52	37	4	12	1	11
14	95	4	128	17	22	7	7	5	3	7	12	13	106	23	6	11	15	9	78	33	4	8	3	9
15	49	2	72	14	13	5	4	4	5	5	4	9	59	18	2	9	8	6	49	26	0	8	0	9
16	60	2	73	11	13	4	6	3	2	3	5	8	60	15	9	8	8	5	43	22	0	8	0	9
17	27	1	70	9	13	3	6	2	1	2	6	6	57	12	1	4	6	3	48	19	1	3	1	2
18	15	1	47	9	5	2	2	1	0	2	3	4	42	9	2	3	4	2	35	15	1	2	0	
19	22	1	48	5	3	1	0		1	2	2	3	45	8	1	3	5	1	39	12	0	2	0	
20	5		27	4	1	1	0		1	1	0	3	26	5	1	2	0	1	25	9	0	2	0	
21	8		37	3	5	1	0		1	1	4	3	32	4	4	2	0	1	27	7	1	1	0	
22	5		17	2	1	1	0		0		1	1	16	3	0		1	1	15	4	0		0	
23	1		15	1	2		0		0		2	1	13	2	0		1		12	3	0		0	
24	0		11	1	0		0		0		0		11	1	0		1		10	2	0		0	
25	1		4	1	0		0		0		0		4	1	0		0		4	1	0		0	
26	0		8	1	1		1		0		0		7	1	0		0		7	1	0		0	
27	0		5		1		0		1		0		4	1	0		0		4		0		0	
28	0		1		0		0		0		0		1		0		0		1		0		0	
29	0		1		0		0		0		0		1		0		0		1		0		0	
30	0		1		1		0		0		1		0		0		0		0		0		0	
Total N	8,125		3,233		1,105		525		266		314		2,128		231		541		1,219		90		47	